



Stockport Golf Club

Sustainable Agronomy Report

Report by Alistair Beggs

Visit Date: Tuesday 7th June 2022

STOCKPORT GOLF CLUB AGRONOMY REVIEW

Club Representatives

Jill Sanders – Director (Part)

Phil Kay – Chair of Green (Part)

Ryan O'Connor – General Manager (Part)

Robert Cleisham – Course Manager

R&A

Alistair Beggs – Head of Sustainable Agronomy

Overview

- This visit represented the first by the author to this highly respected and high-quality venue. The club has a reputation for providing a course which offers a good strategic test of golf with high levels of turf performance and presentation.
- The purpose of this initial visit was to review agronomic elements of the management programme and to offer guidance and advice on sustainable future management. The team are doing many things very well but there are always areas for improvement.
- Although standards are very high the impact of trees on turf management is obvious. I'm conscious that systems are already in place to thin and remove areas of woodland and significant progress has been made in this regard, but there is much more to do. This course would benefit from far fewer trees, with only the best specimens retained. In their place, there is an opportunity to create diverse and botanically rich grasslands which would frame the golfing experience. These grasslands would allow some element of challenge without it being overly penal, permit better airflow, light penetration and turf drainage, and promote more sustainable turf health at lower cost. It is not to overstate matters that the proliferation of trees has impacted negatively on the strategic merit of the course, but more importantly from my perspective, it has impacted negatively on sustainable turf health. Any tree thinning or removal should only be done within the legal framework that exists for this site.
- Greens offer good playing surfaces currently even though the cold spring delayed recovery from spring scarification and coring work. However, the surfaces struggle to retain firmness during the winter months and various forms of drainage have been tried including PC (Rope) drainage at the 1st and 18th, Shelton drainage at the 2nd, 5th, 6th, 7th, 9th, 15th and 16th, and conventional pipe drainage (done very well) at the 3rd and 4th. With the 8th, 12th, 13th, 14th and 17th left to do, my preference is for more of the latter. It is fundamental for all greens to be able to evacuate excess water from the bases beneath them as effectively as possible and newer technologies still have to prove themselves.
- Whilst drainage deficiencies must be remedied first, the thatch build up at the base of the turf and the related dominance of meadow grass (*Poa annua*) must be improved too, if the greens and the maintenance that supports them is to become more sustainable. This will require periodic remedial work as well as the adoption of newer but trusted technologies.
- Tees and surrounds are generally well presented. We like the vision of creating wider, tightly cut surrounds.
- Fairways show good sward composition particularly on the more open and free draining sections of the course with slow growing bents and fescues doing well in such areas. Wetter sections are more productive (Rye and Yorkshire fog) and need cutting more regularly. This needs to be changed over time and more productive grasses discouraged. This will be helped by tree thinning and better drainage.

- Bunkers have undergone various renovation programmes which have employed face stabilisation materials such as Ecobunker, base protection using various forms of rubber crumb and more recently a cost-effective in-house programme involving remedial drainage and sand replenishment. The latter option provides control at lowest cost and if it were combined with sod lining it might provide an effective long-term solution. Give the new sand mix (RHL 45 and WSS) a chance to stabilise.
- The maintenance compound and associated facilities are well below the standards we would expect for a course of this standing. It is hoped that this facility will be targeted for investment at some point soon.
- Although, of less importance than drainage, the irrigation system is old and less than reliable. Again, investment in this area of the course should not be forgotten.
- The 11th hole has been changed architecturally in relatively recent history and the work was done in house. To me, this is the weakest hole on the course and whilst not a priority, the employment of a recognised golf architect should be considered to optimise the merits of this hole and re-connect it with the wider design.

Photographic Gallery and Comments



Photo 1. Overall presentation levels are very good as demonstrated by the approach and green complex at the 15th hole.



Photo 2. Surfaces were complete and smooth to putt. They had largely recovered from spring maintenance although the visual footprint was still apparent on several greens. Better greens were firmer e.g. 10th and 11th whereas poorer greens were softer e.g. 1st, 6th etc. Thinner greens showed some evidence of disease at a low level in the base of the turf and there was some evidence of algae and moss in shaded examples (see below). Meadow grass is the main sward component with some bent in firmer examples. Seed head activity was limited.

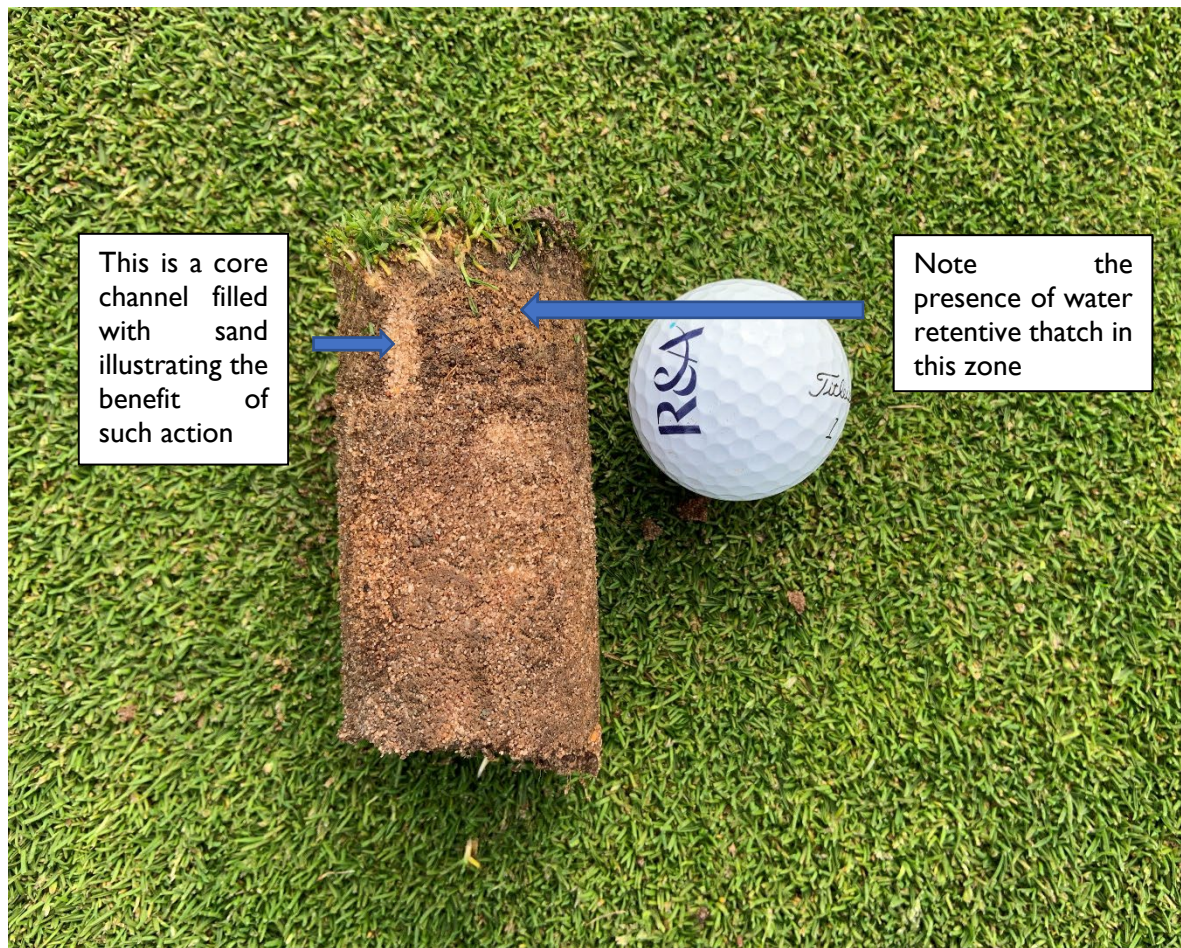


Photo 3. Profiles were relatively consistent in the upper profile and show little in the way of layering. Most cores were moist/wet to depth and root growth extended to about 75mm (3in.). There is visible evidence of water retentive thatch in the upper 25-40mm under most greens and there was evidence of some anaerobic activity here too. All of this could be due to poor or inadequate base drainage.



Photo 4. This is a close-up of the sward at the 8th showing the presence of moss/algae through the base of the turf. The discolouration above the ball is the start of some fusarium activity but this should not require treatment at this time of the year. Nevertheless, it shows the vulnerability of the greens to this condition.



Photo 5. The view down the 18th hole. Tee presentation is excellent and we like the minimalist approach to tee furniture too!



Photo 6. Green surrounds are expansive and are mown at a single height using the Toro 3550 lightweight fairway mower which is perfect for coping with substantial contouring. The aim should be to get these areas to 8-9mm if possible.



Photo 7. Tree thinning is critical to aid airflow and sunlight penetration across the course. Note the view of the clubhouse through the trees at the 2nd hole.



Photo 8. The growing environment to the rear of the 6th green and 7th tee is amongst the weakest on the course. Trees to eastern and southern horizons are significant barriers to the growing of healthy turf. This area should become a priority for improvement.



Photo 9. Several different bunker solutions have been trialled at Stockport including using artificial turf, rubber base layers etc. In recent times remedial drainage and sand replenishment has taken place as a stop gap measure. A decision must be taken on which solution to take. With several options available and liner costs substantial, we favour a circumspect approach (perhaps using remedial drainage and sod lining), at least until modern techniques prove themselves, over several years. Currently the sand is still loose and has not fully packed. Give this time to stabilise.



Photo 10. The maintenance compound is not of the required standard for a course of this standing. Investment is required to provide the greenkeeping team with better working and welfare facilities.

Recommendations

Greens

The primary objective here in the medium term must be to turn rather thatchy annual meadow grass dominant surfaces that are somewhat disease, moss and algae prone into more robust free draining bent/meadow grass surfaces which are firmer, show less surface thatch and require less inputs of fertiliser, water and pesticide. This is a challenge which will require tree thinning and removal and good base drainage as fundamentals. Very little progress will be made unless these two main criteria are met. Work towards achieving both, targeting the weakest and most sheltered green sites as a priority. At the same time, we must work to optimise the surfaces as they exist at present:

- Proceed with the drainage programme as discussed. This should involve the introduction of conventional pipe draining into the base of those greens as yet undrained – 8, 12, 13, 14 and 17. The work that has been done in recent years e.g. 3rd and 4th, has been

done to a very high standard. Monitor the performance of those greens that have the Shelton and PC (Rope) systems in them.

- Try and avoid mowing below 3.5mm as a minimum. We appreciate that green speed is part of the overall experience but the more stress that is applied to the turf the more disease prone it will become.
- Continue to cut by hand when time and resources allow and use light verticutting, grooming, brushing and rolling to support the main mowing programme to deliver the speeds required.
- Aeration should continue to revolve around two main renovation windows in the spring and autumn seasons (April and August). We support the scarification and coring work completed in the spring and this should be repeated again in August to further reduce thatch/organic matter at the base of the turf.
- An alternative would be to try the ninja tines <https://www.agronomics.co.uk/product/category/ninja-and-samurai-tines> which may provide a method of thatch removal on a more regular basis without disruption to play.
- Another option for the future is the Dryject unit (<https://kensiems.com>). This is a sand injection tool which allows sand integration into upper profile layers but again leaves a relatively undisturbed surface behind. This would be a contracted operation and costs circa £4K for 18 greens. It would deliver about 30 tonnes of sand into the greens per operation and can be carried out at any time of the year.
- Continue to use both the vertidrain and the Air2G2 units separately. When vertidrain be aware of the dangers of leatherjackets entering holes and preventing their recovery. There was some evidence of leatherjacket activity of the practice chipping green. Always ensure rapid recovery by filling holes with sand and ensuring the turf is fed sufficiently to recover quickly.
- Monitor Syngenta's outputs on the latest updates for Acelepryn application. This has not been necessary in the past at Stockport but no club is immune to this problem and you should remain vigilant. www.syngentaturf.co.uk/product/turf-management/insecticide/acelepryn
- The nutritional programme is set to deliver in the region 90Kg/Ha N in 2022. In essence this is based around Terralift products (slow-release nitrogen) and is a programme that has delivered good results in the past. We would like to see this level of nitrogen reduced in future years to 60-70Kg/Ha N but it is important this year that the greens get what they need to offset disease and pest threats. Ensure that a good seaweed-based product forms part of the programme and consider using harder forms of nitrogen e.g. ammonium sulphate as part of the autumn winter programme (see below).
- We discussed the application of a "hardening" mix as a key component of the late summer/autumn programme and this should begin in September and continue as required through the autumn and winter. It should be applied at the first signs of disease and in response to forecasts of high disease pressure. This may mean, for instance, two applications in two weeks or one in six weeks? Creating your own mix would be our preferred approach to provide optimal control of inputs.
 - Look to utilise iron sulphate as the iron source as this will be the most acidifying option and therefore most discouraging to disease. Look to apply at a rate of circa 20kg/ha (which will deliver 4kg/ha Fe). Application at the early stages of disease can be very beneficial in aiding disease suppression.
 - Include magnesium sulphate within iron mixes on occasion to aid strengthening and surface acidification. This will provide more of a richer green colour to the turf when compared to iron alone. As an example, a mix of 10kg/ha iron sulphate and 10kg/ha magnesium sulphate could be considered.

- Include potassium within each application to supplement soil reserves and ensure the plant has sufficient at its disposal for disease defence. Use either a proprietary liquid mix or straight sulphate of potash at a rate of 10 – 20kg/ha.
 - Include phosphite as a plant elicitor, selecting a suitable product containing no hidden nitrogen e.g. Asco-Phite (also contains seaweed), Fossil, Terrafirma Fighter, etc. Begin with the first application no later than early September, then continue monthly. It may be that this first application of phosphite is made within one of the routine seaweed or liquid N mixes to the greens if it is deemed too early for hardening mixes to begin.
 - If favourable weather windows occur through the autumn/winter where nitrogen input would be beneficial, then include small amounts of ammonium sulphate within the mix (2 – 5 kg/ha).
- Supplement the above programme with preventative fungicide application as required during periods of heightened disease pressure. Instrata Elite and Medallion remain as the main tools here.
 - Consider using dew dispersants in addition to physical removal to reduce surface moisture. Pathogenic fungi need a moisture film to spread so if it can be broken so much the better.
 - Do not make any changes to the wetting agent programme. Hydroguard is working well and is a good product. Ensure it is applied monthly starting early (late February) each year.
 - Use the Theta probe for moisture recording and aim to keep VMC levels during the season between 15-20%. Do not let greens descend into single digits. This is a key recommendation for keeping anthracnose out of the turf.
 - Consider developing a data recording system. This should be implemented using a standard operating procedure. Keep it simple to begin with. Perhaps work on a monthly cycle using the three greens we use for organic matter collection. Use a 9 spot grid and a further 3 spots across each approach.
 - Collect data for green moisture linked if possible with rainfall data.
 - Consider purchasing a clegg hammer (<https://sdinst.com/>) to measure green firmness and a USGA stimpmer (if you don't already have access to one) for green speed measurement.
(<https://www.usga.org/content/dam/usga/pdf/imported/StimpmerBookletFINAL.pdf>)
 - We note the purchase of the Blec seeder which is aimed at introducing bent seed to greens in the future. This is an ideal machine for this work and promoting bents should be a medium-term sustainable goal. However, in the short-term focus on improving base drainage and reducing thatch. Overseeding will be far more effective once these goals have been achieved.

Green Approaches & Surrounds

- We really like the approach taken here to widen out these areas using the Toro 3555 lightweight fairway mower. Look to get the height of cut to 8-9mm if possible but do this in increments to avoid unnecessary turf stress.

Tees

- The tees are presented to a very high standard and the efforts made hand mowing make a real difference.

- Some of the forward tees are a little soft and moss ridden, probably due to a lack of play. This may require some coring and rolling later in the season or it may be possible to overcome this using the roller.
- Par 3 tees need to be worked harder to maintain good surface levels. Aim to core and sand these tees at least twice per year. Utilise modern fine leaved rye cultivars to aid fast germination and establishment of seed.

Fairways & First Cut Rough

- The fairways vary in their grass composition with drier and firmer examples e.g. 4th, 13th etc., with lower levels of vegetation cover showing high proportions of desirable bent and fescue grasses in the turf. These are the preferred grass types as they grow relatively slowly during the season. They need to be encouraged.
- More productive and wetter sections of fairway e.g. 3rd, 6th, etc show higher proportions of rye and yorkshire fog which are faster growing grasses which need to be cut more regularly. We must work to reduce productivity in these areas which means better drainage, tree thinning and removal where appropriate, sand dressing if it can be afforded and applied, and ultimately grass clipping collection after mowing. All of these initiatives will help control worm activity too.
- There are some examples of areas where fringing roughs of fescue are being introduced inside the tree line. This works where canopies and woodland edges have been taken sufficiently far back from the main playing lines. We would like to see more of this. It will take time to cultivate the correct environment for less productive grasses to frame the woodland edge, once trees have been thinned and removed, but once achieved the course will be more attractive, more biodiverse and fairer to play.

Bunkers

- Bunkers are a hazard and significant greenkeeping time is now spent making them as uniform and consistent as possible. This is a challenging exercise but one that is very necessary as they form an important strategic and visual feature of the course.
- There are several industry solutions available for overcoming weaknesses with bunkers. Some of these have been trialled at Stockport with mixed results.
- At this stage we prefer the use of natural materials not only because they are more affordable but also the work can be upgraded/redone at will should a bunker need to be changed or moved in the future.
- We support the current initiative of draining the bases of bunkers thoroughly and the club could embellish this by lining bases with native sod, as a barrier layer, prior to applying the sand. At the very least this will provide a temporary solution to the lining problem while further debates and deliberations are had on alternative liners and time is given for the industry to reflect on these solutions in situ elsewhere. Do appreciate that the sand may take some time to consolidate and pack to provide the ideal conditions for golf. There is no substitute for moistening and heeling the sand to consolidate it although this is time consuming.
- Advice has been sought on the mixing of the RHL45 and WSS sands. Give this time to settle and seek feedback from golfers.
- Complete the current renovation programme using the above plan. We can continue to review the merits of other bunker solutions as they impact the market over time.

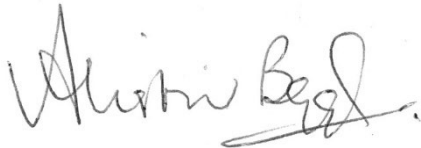
Woodland Management

- As mentioned previously we see effective woodland management as the key item for long term improvement of the course.
- It has an impact on grass health and performance throughout the course.
- Trees obstruct views, impede light and airflow, impact negatively on strategy as they grow and interfere with drainage, primarily by blocking pipe systems in the ground.
- There are some wonderful trees on this site and with this in mind it is vital that the club has a clear and definitive environmental management plan incorporating a woodland management plan to ensure the right trees are removed in the right places at the right time and that the aftermath is managed carefully to minimise negative impacts on aesthetics and playability.
- If this can be done effectively, views will improve, the turf will receive more light and air, it will dry and drain more effectively, and it will become healthier and cheaper to manage with fewer pesticide inputs. Furthermore, the opportunity to develop biodiverse grassland framing will occur inside the canopy line which will allow improved biodiversity and the promotion of pollinating insects such as bees etc.
- Any woodland management programme must be supported by a felling licence from the Forestry Commission, which I understand you have. It makes sense to maintain dialogue with them to ensure this process continues smoothly. If you need assistance in this area we can advise on suitable contacts to expedite this process.

Soil Laboratory Testing Results

- Please see the Appendix of the report for soil laboratory testing results and analysis.

Signed

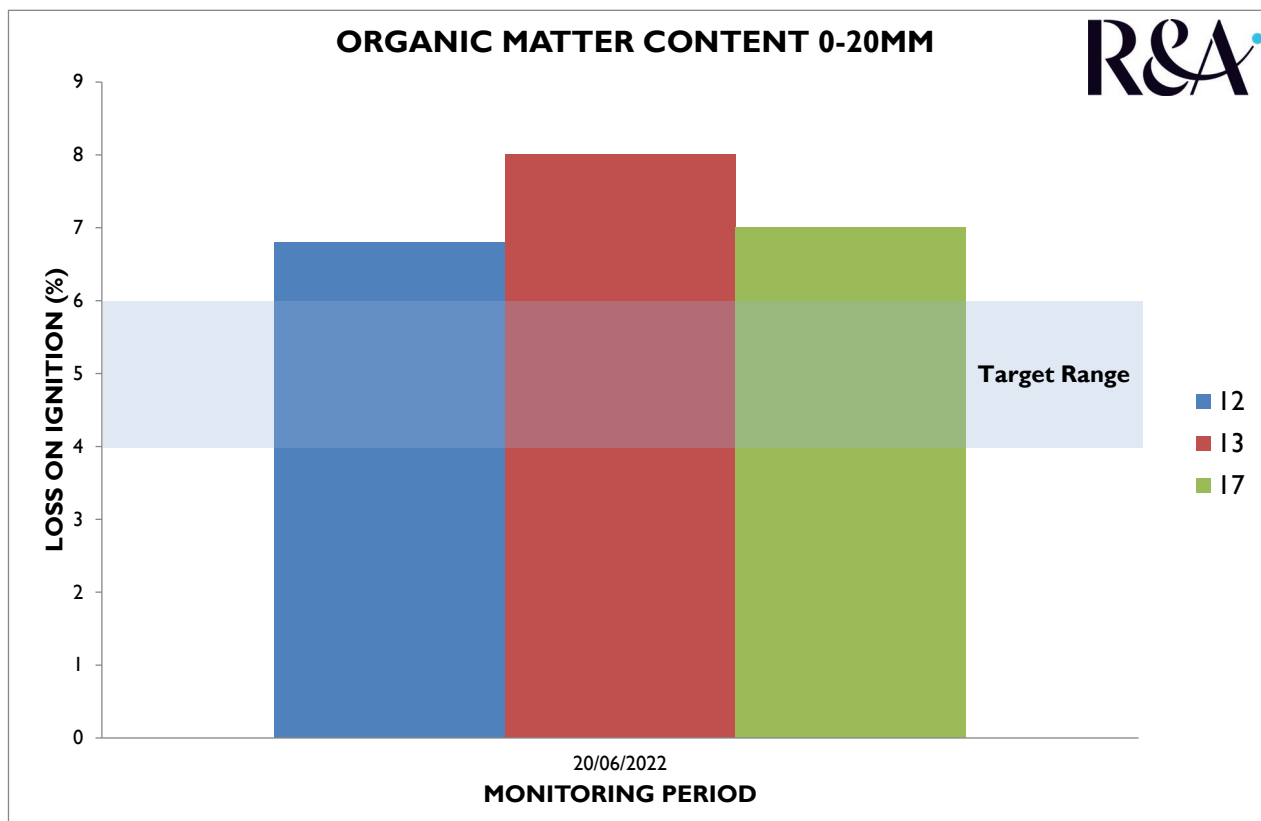


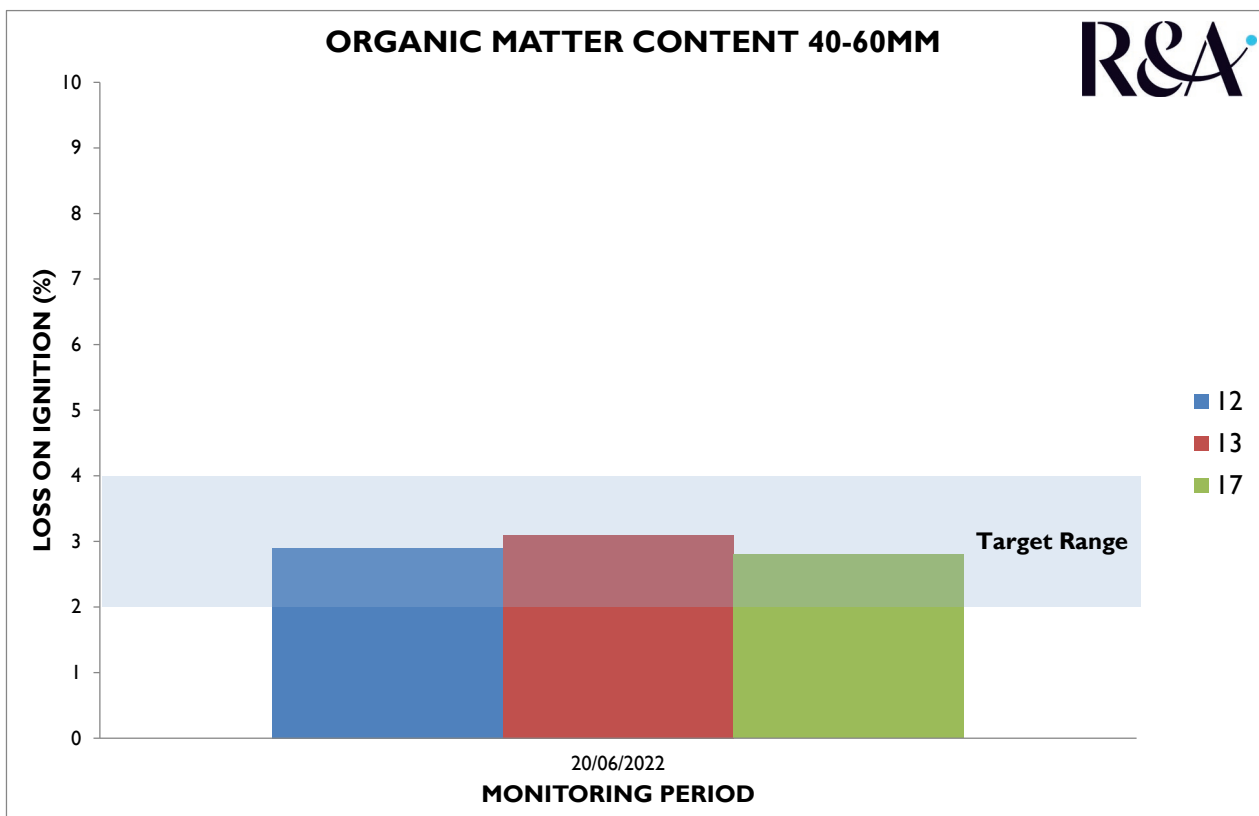
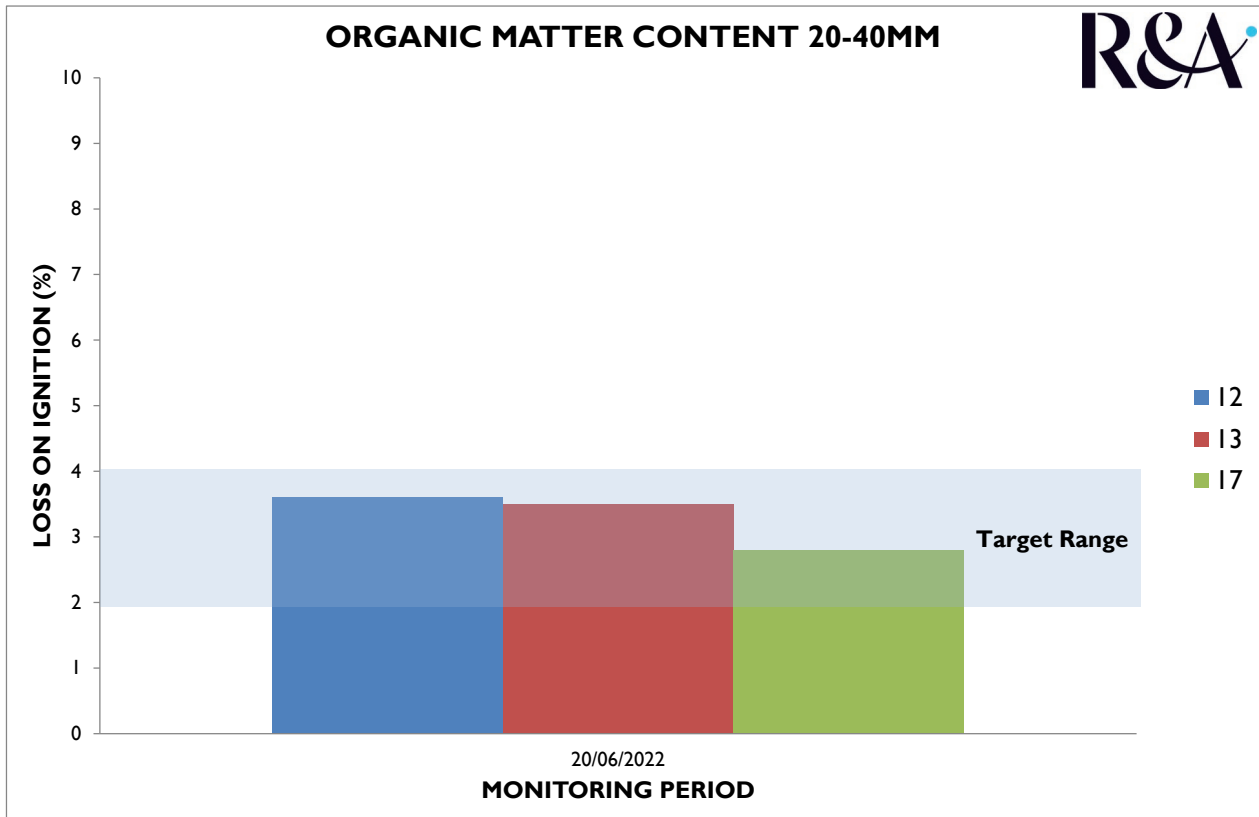
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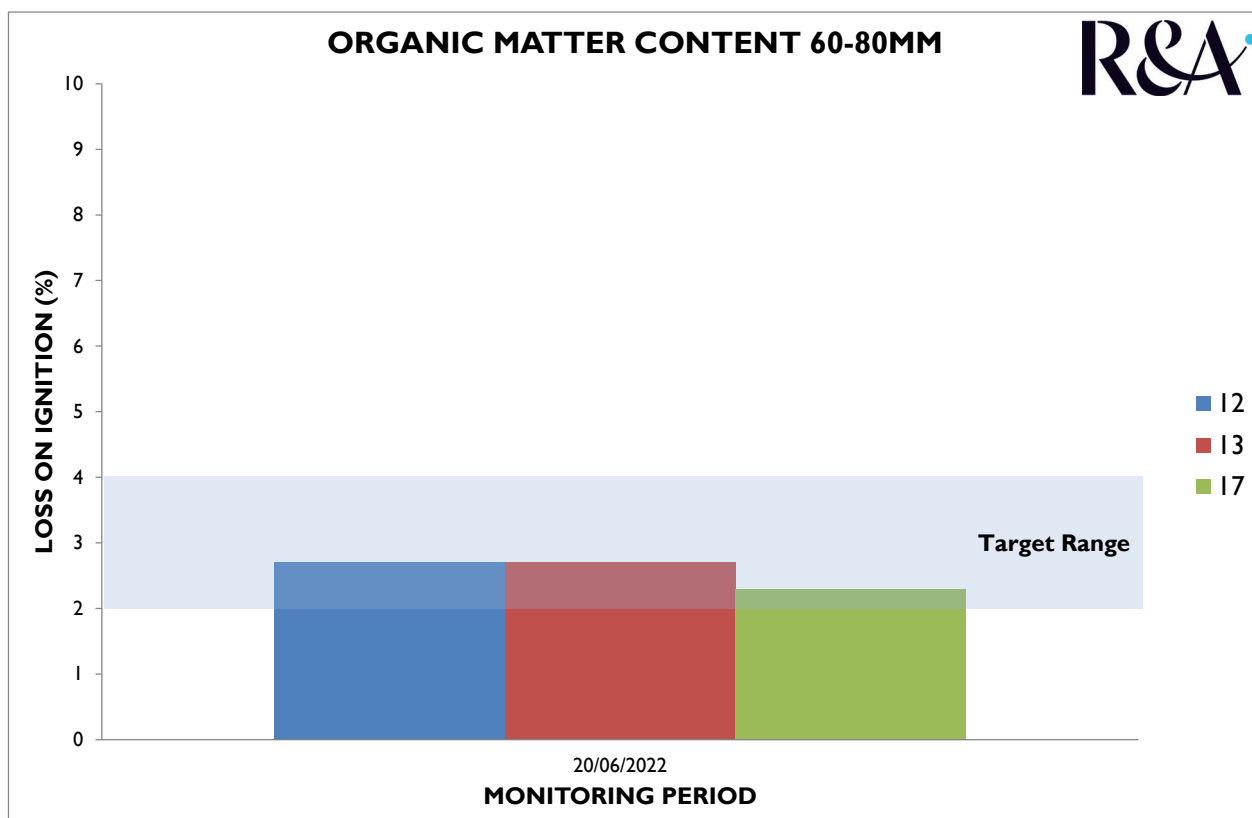
Appendix

Soil Laboratory Results & Analysis

Organic Matter Content				
	0-20 mm	20-40 mm	40-60 mm	60-80 mm
	4.0 – 6.0%	2 - 4%	2 - 4%	2 - 4%
Green 12	6.8	3.6	2.9	2.7
Green 13	8.0	3.5	3.1	2.7
Green 17	7.0	2.8	2.8	2.3
Average	7.3	3.3	2.9	2.6







Comments on Organic Matter:

- Organic matter is a critical part of a soil's structure and it often termed the "biological glue" which holds it together. However, if values get too high it can result in soft and water retentive surfaces that do not perform well in the wetter months of the year. Greens become subject to surface deformation, pitch marking and footprinting under such circumstances and do not cut well. Therefore we have strict guidelines for optimum performance and ideally we want all green lying between 4-6% in the critical top 20mm with a range of 2-4% for the lower ranges. Here at Stockport, values in the lower ranges are all in target, but in the critical top 20mm they are too high (red boxes in table).
- All three test greens exceed the ideal threshold in the top 20mm with the 13th green having the highest value of 8.0%.
- With Poa annua organic matter being particularly water retentive and this grass being the main sward component on the greens at Stockport our aim should be to have OM values nearer 4% than 6%.
- The aim should be to work towards this target over the next five years focussing more on aeration and sanding and at the same time keeping N and water inputs under control.

Soil Nutrient Analysis					
	Soil pH	Phosphate (P ₂ O ₅)	Potassium (K ₂ O)	Magnesium (Mg)	Calcium (Ca)
	5.0-8.0	> 10 mg/l	> 35 mg/l	> 50mg/l	> 150mg/l
Green 12	6.2	20	36	92	427
Green 13	6.1	20	32	86	380
Green 17	6.0	20	35	78	375
Average	6.1	20	34	85	394

Comments on Chemical Analysis

- Chemical results are largely positive and do not reveal any major deficiencies with the nutrient status of soils.
- pH reaction values are averaging 6.1 and are consistent.
- Phosphate, Potassium, magnesium and calcium levels are all within target for healthy growth and require no remedial amendment. Potassium inputs (this is a leachable nutrient) should be made in an approximate 1:1 ratio with nitrogen for the rest of this season.

Annual Chemical, Fertiliser and Water Inputs

R&A Sustainable Agronomy Site Information Questionnaire		
Activity	Quantity	Notes
Total Nitrogen input to greens (Kg/Ha)	90	Terralift TX range (6:2:8)
Total Nitrogen input to tees and surrounds (Kg/Ha)	18	
Total Nitrogen input to fairways (Kg/Ha)		
Total Phosphorous input to greens (Kg/Ha)	27	Terralift - liquid and granular
Total Phosphorous input to tees and surrounds (Kg/Ha)	6	
Total Phosphorous input to fairways (Kg/Ha)		
Total Potassium input to greens (Kg/Ha)	175	
Total Potassium input to tees and surrounds (Kg/Ha)	24	
Total Potassium input to fairways (Kg/Ha)		
Total water use for course and greenkeeping operations (cubic metres)	2083	Quadrop system used
Number of fungicide applications made to greens (do not include spot treatments)		
Total number of applications of insecticide to greens		
Total number of applications of herbicide made to the course (do not include spot treatments)	1	One treatment early May
Sand dressing tonnage for greens (tonnes)	100-150	
Sand dressing tonnage for approaches and tees (tonnes)	30-50	
Sand dressing tonnage for fairways and other areas (tonnes)	0	
Number of staff per 18 holes		
Any notable sustainability initiatives e.g. biodiversity creation, recycling, green mowing etc.		Development of grassland and wildflower areas

Comments on Annual Chemical, Fertiliser and Water Inputs:

- Nitrogen inputs to greens are slightly higher than we would advise and there should be an aim to get levels down towards 60-70Kg/Ha N per annum to help support the sustainable promotion of finer grass types and better control organic matter levels.
- Nitrogen inputs to tees and surrounds are low at 18 Kg/Ha N per annum. These probably need to be a little higher to compensate for routine wear and tear. We would expect this number to be similar to that of greens.
- There is no information for NPK inputs to fairways.
- Phosphorous inputs to all areas are low. However, given this nutrients ability to persist in soils there should not be a requirement to apply it each year.
- Potassium inputs are higher than nitrogen inputs. Generally, a ratio of 1:1 with nitrogen serves us well.
- Water inputs are low. We note the use of Quadrop.
- There is limited information on pesticide inputs but herbicide applications to the course are low.
- Sand tonnages to greens are broadly in line with standard requirements but with N inputs at circa 100 Kg/Ha N there may be requirement to aim for nearer 200 tonnes per annum (over three or four years) on greens to keep organic matter build up under control.
- It is pleasing to note that the club are developing and improving grassland areas and creating wildflower meadows.

